

We claim:

1. A process for the fractionation of water-soluble or water-dispersible amino-containing synthetic polymers having a broad molar mass distribution by ultrafiltration, wherein the polymer solution or dispersion to be fractionated is fed continuously into ultrafiltration circulation with at least one ultrafiltration unit, and retentate having a narrower molar mass distribution and permeate are discharged continuously, in such a way that the ultrafiltration circulation is essentially in a steady state.
2. A process as claimed in claim 1, wherein an aqueous medium having a polymer content of from 3 to 30% by weight is fed in.
3. A process as claimed in claim 1 or 2, wherein a retentate having a polymer content greater than 5% by weight is discharged from the circulation.
4. A process as claimed in any of the preceding claims, wherein from 20 to 90% by weight of the polymer used is separated off as permeate.
5. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out through membranes having a cut-off for polymers with molar masses of from at least 1000 to 500,000 or through membranes having a pore diameter of from 0.01 to 10  $\mu\text{m}$ .
6. A process as claimed in any of the preceding claims, wherein a plurality of ultrafiltration circulations connected in series is used.
7. A process as claimed in any of the preceding claims, wherein the membranes are used in the form of tubes, hollow fibers, plate-and-frame apparatuses, hollow fiber modules, cushion modules or spiral-bound modules.
8. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at an inlet pressure of from 1 to 20 bar.

9. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at a transmembrane pressure of from 0.5 to 10 bar.
- 5 10. A process as claimed in any of the preceding claims, wherein the ultrafiltration is carried out at an inflow of from 0.01 to 10 m/s.
- 10 11. A process as claimed in any of the preceding claims, wherein, in a multistage ultrafiltration, ultrafiltration units having a larger diameter or a larger channel width are used in the last stage.
- 15 12. A process as claimed in any of the preceding claims, wherein the amino-containing polymers are selected from polyalkylenepolyamines, polyamidoamines, polyalkylene glycol polyamines, polyamidoamines grafted with ethyleneimine and then reacted with at least bifunctional crosslinking agents, and mixtures and copolymers thereof.
- 20 13. An amino-containing synthetic polymer obtainable by a process as claimed in any of claims 1 to 12 in the form of the retentate or of a concentrate thereof or in the form of a polymer obtained from the retentate.
- 25 14. The use of the polymers contained in the retentate obtained by a process as claimed in claims 1 to 13, as retention aids, drainage aids and/or fixing compositions in papermaking, as promoters in the sizing of paper with alkyldiketenes, as
- 30 flocculants for sewage sludges, as adhesion promoters in the production of laminated films, as additives in hair setting and skincare compositions and as compositions for immobilizing anionic active ingredients.
- 35 15. A process for the fractionation of water-soluble or water-dispersible synthetic amino-containing polymers by ultrafiltration, wherein the process comprises the following steps:
- 40 a) continuous passage of the polymer solution or dispersion to an ultrafiltration unit,
- b) separation of the polymer solution or dispersion in the ultrafiltration unit into a permeate and a retentate,
- 45 c) discharge of the permeate from the process,

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5 d) discharge of some of the retentate from the process;  
mixing of the remainder of the retentate with the polymer  
solution or dispersion in step a) and, if required,  
essentially polymer-free aqueous medium and passage of  
the mixture to the ultrafiltration unit.

10 16. A process as claimed in claim 15, wherein that part of the  
retentate discharged in d) is subjected to a further  
fractionation by a process comprising the steps a) to d).

17. A process as claimed in claim 15 or 16, which comprises an  
upstream startup phase which has the following steps:

15 a) continuous passage of the polymer solution or dispersion  
to an ultrafiltration unit,

b) separation of the polymer solution or dispersion in the  
ultrafiltration unit into a permeate and a retentate,

20 c) discharge of the permeate from the process,

25 d) mixing of the total retentate with the polymer solution  
or dispersion in step a) and, if required, with  
essentially polymer-free medium and passage of the  
mixture to the ultrafiltration unit until the desired  
degree of fractionation has been reached in the  
retentate.

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